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 near5 (subcarrier\$) or (sub adj carrier\$)) same  
 (satellit\$3)

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<u>L7</u>	(timing or synch\$7) same ((added or combin\$3) near5 (subcarrier\$) or (sub adj carrier\$)) same (satellit\$3)	7	<u>L7</u>
<u>L6</u>	(timing or synch\$7) and ((added or combin\$3) near5 (subcarrier\$) or (sub adj carrier\$)) and (satellit\$3)	239	<u>L6</u>
<u>L5</u>	(timing or synch\$7) and ((added or combin\$3) near5 subchannel\$) and (satellit\$3)	22	<u>L5</u>
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<u>L3</u>	(4901307  5233626  5859874  5867109  5987037  6067442  6154501)! [pn]	14	<u>L3</u>
<u>L2</u>	(timing or synch\$7) same (combin\$3 near5 subchannel\$) same satellit\$3	4	<u>L2</u>
<u>L1</u>	(timing or synch\$7) same (added near5 subchannel\$) same satellit\$3	2	<u>L1</u>

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L5: Entry 1 of 22

File: USPT

Sep 17, 2002

US-PAT-NO: 6452989

DOCUMENT-IDENTIFIER: US 6452989 B1

TITLE: System and method for combining multiple satellite channels into a virtual composite channel

DATE-ISSUED: September 17, 2002

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Friedman; Robert F.	Fayetteville	AR		

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Virtual <u>Satellite</u> Corporation	Fayetteville	AK			02

APPL-NO: 09/ 438865

DATE FILED: November 12, 1999

## PARENT-CASE:

CROSS-REFERENCES TO RELATED APPLICATIONS The present application is a continuation-in-part of Application No. 09/243,910 filed Feb. 3, 1999, now U.S. Pat. No. 6,154,501, and claims priority to Provisional Application No. 60/142,179 filed Jul. 1, 1999.

INT-CL: [07] H04 B 7/10

US-CL-ISSUED: 375/347; 375/344, 455/137

US-CL-CURRENT: 375/347; 375/344, 455/137

FIELD-OF-SEARCH: 375/260, 375/371, 375/267, 375/316, 375/211, 375/347, 375/130, 375/34.4, 455/132, 455/137, 455/138, 455/13.1, 455/13.2, 455/13.3, 455/11.1, 455/12.1, 455/139, 370/315, 370/316, 370/326, 370/274, 370/480

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4901307</u>	February 1990	Gilhousen et al.	375/130
<u>5233626</u>	August 1993	Ames	375/130
<u>5859874</u>	January 1999	Wiedeman	375/267
<u>5867109</u>	February 1999	Wiedeman	455/13.1
<u>5987037</u>	November 1999	Gans	370/480
<u>6067442</u>	May 2000	Wiedeman et al.	455/13.1
<u>6154501</u>	November 2000	Friedman	375/211

ART-UNIT: 2631

PRIMARY-EXAMINER: Bocure; Tesfaldet

## ABSTRACT:

A satellite communications system provides an information channel between remotely located transmitters and receivers. A virtual satellite system provides the same service, but divides the signal either in power or in data content into subchannels such that any particular signal is conducted to the intended receiver via a plurality of traditional satellite channels. The receiving terminal accepts the plurality of signals simultaneously from a possible plurality of satellites, combining the subchannels comprising the virtual channel into the original signal content as if conducted via a single channel. The receiving antenna system receives satellite subchannel signals from a plurality of directions using multiple antennas or a single antenna with multi-direction capability. Prior to signal combining, the receiver necessarily time-synchronizes the plurality of subchannels by introducing time delay in some channels before combining the subsignals into the original composite. A timing signal present in the virtual satellite system assists the receiver in determining the amount of delay to apply to each incoming signal. The timing signal is either a separate carrier or an additional modulation on the existing information-bearing carrier.

21 Claims, 6 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RMMC	Draw Desc	Image
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☐ 2. Document ID: US 6433835 B1

L5: Entry 2 of 22

File: USPT

Aug 13, 2002

US-PAT-NO: 6433835

DOCUMENT-IDENTIFIER: US 6433835 B1

TITLE: Expanded information capacity for existing communication transmission systems

DATE-ISSUED: August 13, 2002

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hartson; Ted E.	Scottsdale	AZ		
Dickinson; Robert V. C.	Allentown	PA		
Ciciora; Walter S.	Southport	CT		

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Encamera Sciences Corporation	Mountain View	CA				02

APPL-NO: 09/ 062225

DATE FILED: April 17, 1998

INT-CL: [07] H04 N 5/21

US-CL-ISSUED: 348/608; 348/723

US-CL-CURRENT: 348/608; 348/723

FIELD-OF-SEARCH: 348/608, 348/723, 348/473, 348/429.1, 348/432.1, 348/470

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>3873771</u>	March 1975	Kleinerman et al.	179/2
<u>3999005</u>	December 1976	Dickinson	358/259
<u>4081497</u>	March 1978	Tokumitsu et al.	260/880R
<u>4302626</u>	November 1981	Streeter	179/1
<u>4310920</u>	January 1982	Hayes	370/11
<u>4316215</u>	February 1982	Yasumoto et al.	358/37
<u>4322842</u>	March 1982	Martinez	370/11
<u>4337479</u>	June 1982	Tomimoto et al.	358/37
<u>4379947</u>	April 1983	Warner	179/1
<u>4469437</u>	September 1984	Yuasa et al.	355/68
<u>4476484</u>	October 1984	Haskell	358/11
<u>4513415</u>	April 1985	Martinez	370/92
<u>4523225</u>	June 1985	Masuda et al.	358/56
<u>4535352</u>	August 1985	Haskell	358/16
<u>4551011</u>	November 1985	Yuasa et al.	355/35
<u>4575225</u>	March 1986	Yuasa et al.	355/38
<u>4576470</u>	March 1986	Yuasa et al.	355/38
<u>4589011</u>	May 1986	Rzeszewski	358/12
<u>4704025</u>	November 1987	Yuasa et al.	355/38
<u>4750036</u>	June 1988	Martinez	358/147
<u>4821097</u>	April 1989	Robbins	358/143
<u>4870489</u>	September 1989	Ducet	358/140
<u>4879606</u>	November 1989	Walter et al.	358/330
<u>4882614</u>	November 1989	Kageyama et al.	358/12
<u>4907218</u>	March 1990	Inoue et al.	370/20
<u>4926244</u>	May 1990	Ismardi	358/12
<u>4928177</u>	May 1990	Martinez	358/142
<u>4944032</u>	July 1990	Kageyama et al.	358/12
<u>4958230</u>	September 1990	Jonnalagadda et al.	358/186
<u>4985769</u>	January 1991	Yasumoto et al.	358/141
<u>5006926</u>	April 1991	Tsinberg	358/12
<u>5036386</u>	July 1991	Yasumoto et al.	358/12
<u>5038402</u>	August 1991	Robbins	455/3
<u>5087975</u>	February 1992	Citta et al.	358/183
<u>5103295</u>	April 1992	Uwabata et al.	358/21R
<u>5103310</u>	April 1992	Gibson et al.	358/141
<u>5126998</u>	June 1992	Stem, Jr.	370/11
<u>5134464</u>	July 1992	Basile et al.	358/12
<u>5142353</u>	August 1992	Kageyama et al.	358/12
<u>5151783</u>	September 1992	Faroudja	358/133
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<u>5214501</u>	May 1993	Cavallerano et al.	358/12
<u>5247351</u>	September 1993	Cho	358/11
<u>5270817</u>	December 1993	Hayashi et al.	358/142
<u>5276507</u>	January 1994	Uwabata et al.	358/36
<u>5287180</u>	February 1994	White	358/484
<u>5291289</u>	March 1994	Hulyalkar et al.	358/723

<u>5293633</u>	March 1994	Robbins	455/3.1
<u>5321514</u>	June 1994	Martinez	348/723
<u>5357284</u>	October 1994	Todd	348/486
<u>5386239</u>	January 1995	Wang et al.	348/472
<u>5442403</u>	August 1995	Yasumoto et al.	348/432
<u>5448299</u>	September 1995	Yang et al.	348/475
<u>5461426</u>	October 1995	Limberg et al.	348/475
<u>5534933</u>	July 1996	Yang	348/433
<u>5550579</u>	August 1996	Martinez	348/12
<u>5563664</u>	October 1996	Yang et al.	348/475
<u>5586121</u>	December 1996	Moura et al.	370/404
<u>5589872</u>	December 1996	Martinez	348/12
<u>5596361</u>	January 1997	Martinez	348/12
<u>RE35774</u>	April 1998	Moura et al.	348/12
<u>5812184</u>	September 1998	Martinez	348/12
<u>5818845</u>	October 1998	Moura et al.	370/449
<u>5828655</u>	October 1998	Moura et al.	370/236
<u>5859852</u>	January 1999	Moura et al.	370/449
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<u>5946048</u>	August 1999	Levan	348/473
<u>5946322</u>	August 1999	Moura et al.	370/468
<u>5956346</u>	September 1999	Levan	370/480
<u>5959660</u>	September 1999	Levan	348/12
<u>5959997</u>	September 1999	Moura et al.	370/404
<u>6005850</u>	December 1999	Moura et al.	370/282
<u>6016316</u>	January 2000	Moura et al.	370/389
<u>6104727</u>	August 2000	Moura et al.	370/468

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FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0 577 351	January 1994	EP	

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Advertisement in The Indianapolis News, WavePhore Stock Is On Roll , dated May 23, 1995.

Advertisement in Investor's Business Daily, Intel, WavePhore Set Technology Alliance, dated Monday, May 8, 1995.

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Kaufman, C., "Network Security," Prentice Hall, 1995 ISBN 0-13-061466.1.

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ART-UNIT: 2611

PRIMARY-EXAMINER: Kostak; Victor R.

#### ABSTRACT:

A system for transmitting digital programming includes a program source providing digital information, circuitry for modulating the digital information onto a visual carrier modulated with analog television programming, and a visual transmitter coupled to the modulating circuitry. Using a phase modulation method, the system phase modulates the digital information onto a visual carrier, reduces the baseband frequencies of the phase modulated visual carrier, and amplitude modulates the phase-modulated video carrier onto a video signal. The amplified and encoded video signal are combined with an amplified sound signal and transmitted. Using an additive method, the system modulates the sidebands of the video carrier with the digital information and amplitude modulates the video signal onto the video carrier. The data-modulated sidebands are phase-shifted such that they will be in quadrature with the amplitude-modulated video signal. The system combines the amplitude-modulated video carrier and the data-modulated quadrature sidebands. With a blended multiplicative/additive method, the system provides phase modulation and quadrature sideband addition to provide an optimized result. Process, systems, circuits and devices for abating or otherwise correcting effects of the information on the analog television signal are also disclosed.

20 Claims, 83 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWMC	Draw Desc	Image
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☐ 3. Document ID: US 6256357 B1

L5: Entry 3 of 22

File: USPT

Jul 3, 2001

US-PAT-NO: 6256357

DOCUMENT-IDENTIFIER: US 6256357 B1

TITLE: Communication system

DATE-ISSUED: July 3, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Oshima; Mitsuaki	Kyoto			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Matsushita Electric Industrial Co., Ltd.	Osaka			JP		03

APPL-NO: 09/ 379746

DATE FILED: August 24, 1999

PARENT-CASE:

This application is a Divisional of application Ser. No. 09/061,979, now U.S. Pat. No. 5,999,569, filed Apr. 17, 1998 which is a Division of application Ser. No. 08/037,108, now U.S. Pat. No. 5,819,000, filed Mar. 25, 1993.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	4-67934	March 26, 1992
JP	4-256070	September 25, 1992

INT-CL: [07] H04 N 5/46

US-CL-ISSUED: 375/261, 375/280, 375/298, 375/308, 375/324, 375/332, 348/433, 348/555, 348/726, 329/304, 332/103

US-CL-CURRENT: 375/261, 329/304, 332/103, 348/433.1, 348/555, 348/726, 375/280, 375/298, 375/308, 375/324, 375/332

FIELD-OF-SEARCH: 375/261, 375/279, 375/280, 375/284, 375/298, 375/308, 375/324, 375/329, 375/332, 348/555, 348/426, 348/432, 348/433, 348/726, 329/304, 332/103

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>3909721</u>	September 1975	Bussgang et al.	
<u>4048572</u>	September 1977	Dogliotti et al.	
<u>4227152</u>	October 1980	Godard et al.	
<u>4271527</u>	June 1981	Armstrong	
<u>4525846</u>	July 1985	Bremer et al.	
<u>4630287</u>	December 1986	Armstrong	
<u>4636876</u>	January 1987	Schwartz	
<u>4751478</u>	June 1988	Yoshida	
<u>4855692</u>	August 1989	Kennard et al.	
<u>4873701</u>	October 1989	Tretter	
<u>4891806</u>	January 1990	Farias et al.	
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<u>4937844</u>	June 1990	Kao	
<u>4958360</u>	September 1990	Sari	
<u>5038219</u>	August 1991	Yamashita et al.	
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<u>5086340</u>	February 1992	Citta et al.	
<u>5087975</u>	February 1992	Citta et al.	
<u>5105442</u>	April 1992	Wei	
<u>5115453</u>	May 1992	Calderbank et al.	
<u>5142353</u>	August 1992	Kageyama et al.	
<u>5164963</u>	November 1992	Lawrence et al.	
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<u>5168509</u>	December 1992	Nakamura et al.	
<u>5197061</u>	March 1993	Halbert-Lassalle et al.	
<u>5267021</u>	November 1993	Ramchandran et al.	
<u>5282019</u>	January 1994	Basile et al.	
<u>5291289</u>	March 1994	Hulyalkar et al.	
<u>5311547</u>	May 1994	Wei	
<u>5311550</u>	May 1994	Fouche et al.	
<u>5398073</u>	March 1995	Wei	
<u>5452015</u>	September 1995	Hulyalkar	
<u>5481412</u>	January 1996	Bannai et al.	
<u>5555275</u>	September 1996	Oshima	
<u>5565926</u>	October 1996	Bryan et al.	348/426
<u>5565932</u>	October 1996	Gitta et al.	

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FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
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0122805	October 1984	EP	
0282298	September 1988	EP	
0311188	April 1989	EP	
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0448492A1	September 1991	EP	
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0506400A2	September 1992	EP	
0525641A2	February 1993	EP	
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0540231A2	May 1993	EP	
53-108215	September 1978	JP	
53-137657	December 1978	JP	
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M. Pecot et al., "Complatible Coding of Television Images, Part 2. Compatible System", Signal Processing Image Communication, Oct. 2, 1990, No. 3, pp. 259-268.

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Thomas M. Cover, Broadcast Channels, IEEE Transactions on Information Theory, Jan. 1972, pp. 2-14.

"Optimum Weighted PCM for Speech Signals", Sundberg, IEEE Transactions on Communications, vol. COM-26, No. 6, Jun. 1978, pp. 872-881.

ART-UNIT: 274

PRIMARY-EXAMINER: Le; Amanda T.

ABSTRACT:

At the transmitter side, carrier waves are modulated according to an input signal for producing relevant signal points in a signal space diagram. The input signal is divided into, two, first and second, data streams. The signal points are divided into signal point groups to which data of the first data stream are assigned. Also, data of the second data stream are assigned to the signal points of each signal point group. A difference in the transmission error rate between first and second data streams is developed by shifting the signal points to other positions in the space diagram. At the receiver side, the first and/or second data streams can be reconstructed from a received signal. In TV broadcast service, a TV signal is divided by a transmitter into, low and high, frequency band components which are designated as a first and a second data stream respectively. Upon receiving the TV signal, a receiver can reproduce only the low frequency band component or both the low and high frequency band components, depending on its capability.

5 Claims, 142 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Image
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☐ 4. Document ID: US 6154501 A

L5: Entry 4 of 22

File: USPT

Nov 28, 2000

US-PAT-NO: 6154501

DOCUMENT-IDENTIFIER: US 6154501 A

TITLE: Method and apparatus for combining transponders on multiple satellites into virtual channels

DATE-ISSUED: November 28, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Friedman; Robert F.	Fayetteville	AR	72701	

APPL-NO: 09/ 243910

DATE FILED: February 3, 1999

PARENT-CASE:

This application claims benefit to provisional application 60/073619 filed Feb. 4, 1998 and application 60/113693 filed Dec. 24, 1998.

INT-CL: [07] H04 B 3/36, H04 B 7/17, H04 L 27/28, H04 L 23/02

US-CL-ISSUED: 375/260; 375/211, 375/267, 455/13.1, 455/61

US-CL-CURRENT: 375/260; 375/211, 375/267, 455/13.1, 455/61FIELD-OF-SEARCH: 375/260, 375/267, 375/211, 375/295, 375/347, 375/316, 375/299,  
455/13.3, 455/12.1, 455/13.1, 455/61, 455/59, 455/101, 455/132, 455/137, 455/139,  
370/316, 370/480, 370/315

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
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<u>5592471</u>	January 1997	Briskman	375/130
<u>5625876</u>	April 1997	Gilhousen et al.	455/33.3
<u>5642358</u>	June 1997	Dent	455/13.3
<u>5720039</u>	February 1998	Lieberman	455/10
<u>5745839</u>	April 1998	Lieberman	455/10
<u>5758261</u>	May 1998	Wiedeman	455/13.1
<u>5781845</u>	July 1998	Dybdal et al.	455/103
<u>5790939</u>	August 1998	Malcolm et al.	455/13.2
<u>5859874</u>	January 1999	Wiedeman et al.	375/267
<u>5867109</u>	February 1999	Wiedeman	340/827
<u>5987037</u>	November 1999	Ganes	455/103

ART-UNIT: 271

PRIMARY-EXAMINER: Bocure; Tesfaldet

## ABSTRACT:

A satellite communications system provides an information channel between remotely located transmitters and receivers. A virtual satellite system provides the same service, but divides the signal either in power or in data content into subchannels such that any particular signal is conducted to the intended receiver via a plurality of traditional satellite channels. The receiving terminal accepts the plurality of signals simultaneously from a possible plurality of satellites, combining the subchannels comprising the virtual channel into the original signal content as if conducted via a single channel. The receiving antenna system receives satellite subchannel signals from a plurality of directions using multiple antennas or a single antenna with multi-direction capability. Prior to signal combining, the receiver necessarily time-synchronizes the plurality of subchannels by introducing time delay in some channels before combining the subsignals into the original composite. A timing signal present in the virtual satellite system assists the receiver in determining the amount of delay to apply to each incoming signal. The timing signal is either a separate carrier or an additional modulation on the existing information-bearing carrier.

34 Claims, 5 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 5. Document ID: US 6049651 A

L5: Entry 5 of 22

File: USPT

Apr 11, 2000

US-PAT-NO: 6049651

DOCUMENT-IDENTIFIER: US 6049651 A

TITLE: Communication system

DATE-ISSUED: April 11, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Oshima; Mitsuaki	Kyoto			JP

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Matsushita Electric Industrial Co., Ltd.	Osaka			JP		03

APPL-NO: 09/ 064147

DATE FILED: April 22, 1998

## PARENT-CASE:

This application is a Division of application Ser. No. 08/126,589 filed Sep. 27, 1993 now U.S. Pat. No. 5,892,879 which is a continuation of Ser. No. 08/037108 filed Mar. 25, 1993 now U.S. Pat. No. 5,819,000.

## FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	4-67934	March 26, 1992
JP	4-256070	September 25, 1992
JP	5-66461	March 25, 1993

INT-CL: [07] H04 N 5/91, H04 N 7/015, H04 N 5/38

US-CL-ISSUED: 386/46; 386/123, 348/726

US-CL-CURRENT: 386/46; 348/726, 386/123

FIELD-OF-SEARCH: 386/46, 386/92, 386/37, 386/95, 386/109, 386/111, 386/112, 386/123, 386/124, 386/27, 386/33, 386/40, 386/1, 348/726, 348/729, 348/723, 348/725, 348/737, 348/21, 348/22, 348/24, 348/608, 348/636

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5087975</u>	February 1992	Citta et al.	348/724

## FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0485108	May 1992	EP	
0485105	May 1992	EP	
0506400	September 1992	EP	
0540231	May 1993	EP	

## OTHER PUBLICATIONS

4th International Workshop on HDTV, Sep. 1991, Torino, IT; Elsevier 1992; pp. 61-69, Uz et al.: "Multiresolution source and channel coding for digital broadcast of HDTV".

SMPTE Journal, vol. 101, No. 8, Aug. 1992, Scarsdale, NY US; pp. 538-549, Schreiber  
`Spread--spectrum television broadcasting`.  
Signal Processing: Image Communication, vol. 4, Aug. 1992, Amsterdam NL; pp.  
283-292, Uz et al.: `Combined multiresolution source coding and modulation for  
digital broadcast of HDTV`.  
Multidimensional Systems and Signal Processing, vol. 3, No. 2-3, May 1992, NL pp.  
161-187, Vetterli Et and Uz: `Multiresolution coding techniques for digital  
television: a review`.  
IEEE Transactions on Information Theory, vol. 18, No. 1, Jan. 1972, New York, US;  
pp. 2-14, Cover: `Broadcast channels`.  
IEEE Global Telecommunications Conference 1991, 2-5/12/1991, Phoenix, US; IEEE New  
York, US, 1991: pp 40-46, Hoehner et al.: "Performance of an RCPC--coded OFDM--based  
digital audio broadcasting (DAB) system".  
Biglieri et al. `Introduction to Trellis-Coded Modulation with Applications` 1991,  
MacMillan, New York, US.  
IEEE International Conference on Communications, May 23-26, 1993, Geneva, CH; New  
York, US, 1993; pp. 1081-1085, Fazel & Ruf: `Combined multilevel coding and  
multiresolution modulation`.  
European Transactions on Telecommunications and Related Technologies, vol. 4, No. 3,  
May 1993, Italy; pp. 325-334, Seshadri & Sundberg `Multi-level block coded  
modulations with unequal error protection for the Rayleigh fading channel`.

ART-UNIT: 272

PRIMARY-EXAMINER: Chevalier; Robert

ABSTRACT:

At the transmitter side, carrier waves are modulated according to an input signal for producing relevant signal points in a signal space diagram. The input signal is divided into, two, first and second, data streams. The signal points are divided into signal point groups to which data of the first data stream are assigned. Also, data of the second data stream are assigned to the signal points of each signal point group. A difference in the transmission error rate between first and second data streams is developed by shifting the signal points to other positions in the space diagram expressed at least in the polar coordinate system. At the receiver side, the first and/or second data streams can be reconstructed from a received signal. In TV broadcast service, a TV signal is divided by a transmitter into, low and high, frequency band components which are designated as a first and a second data streams respectively. Upon receiving the TV signal, a receiver can reproduce only the low frequency band component or both the low and high frequency band components, depending on its capability. Furthermore, a communication system based on an OFDM system is utilized for data transmission of a plurality of subchannels, wherein the subchannels are differentiated by changing the length of a guard time slot or a carrier wave interval of a symbol transmission time slot, or changing the transmission electric power of the carrier.

3 Claims, 168 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 6. Document ID: US 5999569 A

L5: Entry 6 of 22

File: USPT

Dec 7, 1999

US-PAT-NO: 5999569

DOCUMENT-IDENTIFIER: US 5999569 A

TITLE: Communication system

DATE-ISSUED: December 7, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Oshima; Mitsuaki	Kyoto			JP

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Matsushita Electric Industrial Co., Ltd.	Osaka			JP		03

APPL-NO: 09/ 061979

DATE FILED: April 17, 1998

## PARENT-CASE:

This application is a Division of application Ser. No. 08/037,108 filed Mar. 25, 1993 U.S. Pat. No. 5,819,000.

## FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	4-067934	March 26, 1992
JP	4-256070	September 25, 1992

INT-CL: [06] H04 L 27/28, H04 L 5/12, H04 L 23/02

US-CL-ISSUED: 375/265; 348/608, 348/607, 348/726

US-CL-CURRENT: 375/265; 348/607, 348/608, 348/726

FIELD-OF-SEARCH: 348/155, 348/384-385, 348/389, 348/432, 348/471, 348/487, 348/554, 348/726, 371/37.5, 371/37.11, 371/43.4, 375/265, 375/340-341

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5086340</u>	February 1992	Citta et al.	358/141
<u>5087975</u>	February 1992	Citta et al.	358/183
<u>5105442</u>	April 1992	Wei	375/39
<u>5142353</u>	August 1992	Kageyama et al.	358/554
<u>5398073</u>	March 1995	Wei	348/487
<u>5452015</u>	September 1995	Hulyalker	348/608
<u>5565932</u>	October 1996	Citta et al.	348/678

ART-UNIT: 274

PRIMARY-EXAMINER: Chin; Stephen

ASSISTANT-EXAMINER: Roundtree; Joseph

## ABSTRACT:

At the transmitter side, carrier waves are modulated according to an input signal for producing relevant signal points in a signal space diagram. The input signal is divided into, two, first and second, data streams. The signal points are divided into signal point groups to which data of the first data stream are assigned. Also, data of the second data stream are assigned to the signal points of each signal point group. A difference in the transmission error rate between first and second

data streams is developed by shifting the signal points to other positions in the space diagram. At the receiver side, the first and/or second data streams can be reconstructed from a received signal. In TV broadcast service, a TV signal is divided by a transmitter into, low and high, frequency band components which are designated as a first and a second data stream respectively. Upon receiving the TV signal, a receiver can reproduce only the low frequency band component or both the low and high frequency band components, depending on its capability.

13 Claims, 138 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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WWW	Draw Desc	Image
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☐ 7. Document ID: US 5956346 A

L5: Entry 7 of 22

File: USPT

Sep 21, 1999

US-PAT-NO: 5956346

DOCUMENT-IDENTIFIER: US 5956346 A

TITLE: Broadband communication system using TV channel roll-off spectrum

DATE-ISSUED: September 21, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Levan; William	San Jose	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Hybrid Networks, Inc.	San Jose	CA			02

APPL-NO: 08/ 735110

DATE FILED: October 22, 1996

INT-CL: [06] H04 J 1/00

US-CL-ISSUED: 370/480; 370/312, 348/385

US-CL-CURRENT: 370/480; 370/312, 375/240.01

FIELD-OF-SEARCH: 370/480, 370/477, 370/486, 370/487, 370/312, 370/522, 370/535, 370/481, 370/482, 370/484, 370/485, 370/488, 348/385, 348/423

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5530471</u>	June 1996	Gockler et al.	370/487
<u>5553064</u>	September 1996	Paff et al.	370/487
<u>5610916</u>	March 1997	Kostreski et al.	370/487
<u>5646942</u>	July 1997	Oliver et al.	370/312

ART-UNIT: 272

PRIMARY-EXAMINER: Olms; Douglas W.

ASSISTANT-EXAMINER: Hom; Shick

## ABSTRACT:

An apparatus and method for channelizing wide band data at radio frequencies (RF) above that of a highest television channel a television headend is equipped to utilize or below 54MHz. In particular, the apparatus and method functioning so as to transmit 2MHz subchannels of data at roll-off band frequencies to at least one client in full-duplex, asymmetric hybrid network communication system.

43 Claims, 11 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KWIC	Draw Desc	Image
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☐ 8. Document ID: US 5946326 A

L5: Entry 8 of 22

File: USPT

Aug 31, 1999

US-PAT-NO: 5946326

DOCUMENT-IDENTIFIER: US 5946326 A

TITLE: Method and an equipment for transmitting a file-based multimedia and hypermedia service to a mobile receiver

DATE-ISSUED: August 31, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rinne; Mika	Espoo			FI

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Nokia Telecommunications Oy	Espoo			FI	03

APPL-NO: 08/ 782926

DATE FILED: January 13, 1997

## FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
FI	952298	May 11, 1995

## PCT-DATA:

APPL-NO	DATE-FILED	PUB-NO	PUB-DATE	371-DATE	102 (E) -DATE
PCT/FI96/00247	May 3, 1996	WO96/36141	Nov 14, 1996	Jan 13, 1997	Jan 13, 1997

INT-CL: [06] H04 J 11/00

US-CL-ISSUED: 370/486; 370/522, 370/538, 370/208, 348/385, 348/7

US-CL-CURRENT: 725/54; 348/385.1, 370/208, 370/522, 370/538

FIELD-OF-SEARCH: 370/465, 370/468, 370/522, 370/486, 370/487, 370/537, 370/493, 370/496, 370/473, 370/474, 370/203, 370/208, 370/538, 348/7, 348/12, 348/13, 348/331, 348/385, 348/387

## PRIOR-ART-DISCLOSED:



PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4713758</u>	December 1987	De Kelaita	364/200
<u>5124943</u>	June 1992	Lubarsky	395/200
<u>5359601</u>	October 1994	Wasilewski et al.	
<u>5400401</u>	March 1995	Wasilewski et al.	
<u>5446888</u>	August 1995	Pyne	395/600
<u>5452288</u>	September 1995	Rahuel et al.	
<u>5799192</u>	August 1998	Yasuda	309/705

## FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
43 19 217	February 1995	DE	

## OTHER PUBLICATIONS

Kimmo Hakkarainen, "A Channel Encoder/Decoder for DAB Demonstrator", Mar. 1995, pp. I-51.

ART-UNIT: 272

PRIMARY-EXAMINER: Nguyen; Chau

ASSISTANT-EXAMINER: Vu; Thinh

## ABSTRACT:

An apparatus and a method for transferring an audio/video/data service from a transmission end to a reception end over a radio interface. The audio/video/data service includes one of audio information, video information and data. The radio interface includes a plurality of subchannels and a plurality of carriers for transmitting the audio/video/data service and at least one information channel. The audio/video/data service is divided into a set of files, wherein the set of files forms a service ensemble. A parameter group is associated with and describes each corresponding one of the files. Each of the files, along with a corresponding parameter group is placed onto one of the subchannels. A placement indicator and a corresponding parameter group is placed on the at least one information channel. The subchannels and the at least one information channel are multiplexed into a plurality of transmission frames which are digitally modulated for transmission to the reception end over the radio interface using the plurality of carriers. The reception end receives the plurality of carriers and demodulates, from the carriers, the transmission frames, separating the subchannels and the at least one information channel. Information received from the at least one information channel is used for separating the parameter groups from the subchannels. The parameter groups are used for forming a selective service by combining and processing substantially only desired files.

12 Claims, 5 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Image
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☐ 9. Document ID: US 5892879 A

L5: Entry 9 of 22

File: USPT

Apr 6, 1999

US-PAT-NO: 5892879

DOCUMENT-IDENTIFIER: US 5892879 A

TITLE: Communication system for plural data streams

DATE-ISSUED: April 6, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Oshima; Mitsuaki	Kyoto			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Matsushita Electric Industrial Co., Ltd.	Osaka			JP		03

APPL-NO: 08/ 126589

DATE FILED: September 27, 1993

PARENT-CASE:

CROSS-REFERENCE TO RELATED APPLICATIONS This application is a Continuation-in-Part of application Ser. No. 08/037,108 filed Mar. 25, 1993.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	4-067934	March 26, 1992
JP	4-256070	September 25, 1992
JP	5-066461	March 25, 1993
JP	5-132984	May 10, 1993

INT-CL: [06] H04 N 5/91, H04 N 5/38

US-CL-ISSUED: 386/46; 348/726

US-CL-CURRENT: 386/46; 348/726

FIELD-OF-SEARCH: 358/335, 348/17, 348/729, 348/21, 348/22, 348/608, 348/636, 348/723, 348/725, 348/737, 348/24, 386/46

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5164963</u>	November 1992	Lawrence et al.	375/39
<u>5166924</u>	November 1992	Moose	370/32.1
<u>5267021</u>	November 1993	Ramchandram et al.	358/12
<u>5291289</u>	March 1994	Hulyalkar et al.	348/723
<u>5600672</u>	February 1997	Oshima et al.	375/219

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0448492	September 1991	EP	
0485105	May 1992	EP	
0485108	May 1992	EP	
0506400	September 1992	EP	
0531046	March 1993	EP	
0540231	May 1993	EP	

OTHER PUBLICATIONS

Biglieri et al. `Introduction to Trellis-Coded Modulation with Applications` 1991, MacMillan, New York, US.  
IEEE International Conference on Communications, 23-26 May, 1993, Geneva, CH; New York, US, 1993; pp. 1081-1085, Fazel & Ruf: `Combined multilevel coding and multiresolution modulation`.  
European Transactions on Telecommunications and Related Technologies, vol. 4, No. 3, May 1993, Italy; pp. 325-334, Seshadri & Sundberg `Multi-level block coded modulations with unequal error protection for the Rayleigh fading channel`.  
4th International Workshop on HDTV, Sep. 1991, Torino, IT; Elsevier 1992; pp. 61-69, Uz et al.: "Multiresolution source and channel coding for digital broadcast of HDTV".  
SMPTE Journal, vol. 101, No. 8, Aug. 1992, Scarsdale, NY US; pp. 538-549, Schreiber `Spread-spectrum television broadcasting`.  
Signal Processing: Image Communication, vol. 4, Aug. 1992, Amsterdam NL; pp. 283-292, Uz et al.: `Combined multiresolution source coding and modulation for digital broadcast of HDTV`.  
Multidimensional Systems and Signal Processing, vol. 3, No. 2-3, May 1992, NL pp. 161-187, Vetterli Et and Uz: `Multiresolution coding techniques for digital television: a review`.  
IEEE Transactions on Information Theory, vol. 18, No. 1, Jan. 1972, New York, US; pp. 2-14, Cover: `Broadcast channels`.  
IEEE Global Telecommunications Conference 1991, 2-5 Dec, 1991, Phoenix, US; IEEE New York, US, 1991; pp. 40-46, Hoehner et al.: "Performance of an RCPC-coded OFDM-based digital audio broadcasting (DAB) system".

ART-UNIT: 272

PRIMARY-EXAMINER: Chevalier; Robert

#### ABSTRACT:

At the transmitter side, carrier waves are modulated according to an input signal for producing relevant signal points in a signal space diagram. The input signal is divided into, two, first and second, data streams. The signal points are divided into signal point groups to which data of the first data stream are assigned. Also, data of the second data stream are assigned to the signal points of each signal point group. A difference in the transmission error rate between first and second data streams is developed by shifting the signal points to other positions in the space diagram expressed at least in the polar coordinate system. At the receiver side, the first and/or second data streams can be reconstructed from a received signal. In TV broadcast service, a TV signal is divided by a transmitter into, low and high, frequency band components which are designated as a first and a second data streams respectively. Upon receiving the TV signal, a receiver can reproduce only the low frequency band component or both the low and high frequency band components, depending on its capability. Furthermore, a communication system based on an OFDM system is utilized for data transmission of a plurality of subchannels, wherein the subchannels are differentiated by changing the length of a guard time slot or a carrier wave interval of a symbol transmission time slot, or changing the transmission electric power of the carrier.

17 Claims, 171 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KVMC	Draw Desc	Image
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☐ 10. Document ID: US 5864747 A

L5: Entry 10 of 22

File: USPT

Jan 26, 1999

US-PAT-NO: 5864747

DOCUMENT-IDENTIFIER: US 5864747 A

TITLE: Data bridge

DATE-ISSUED: January 26, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Clark; Anthony S.	Eagan	MN		
Nelson; Curtis L.	Excelsior	MN		

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
General Dynamics Information Systems, Inc.	Falls Church	VA			02	

APPL-NO: 08/ 701344

DATE FILED: August 22, 1996

INT-CL: [06] H04 N 7/10

US-CL-ISSUED: 455/3.2; 370/487

US-CL-CURRENT: 725/67; 370/487, 725/68

FIELD-OF-SEARCH: 455/3.2, 455/6.2, 455/12.1, 455/400, 370/349, 370/350, 370/345, 370/347, 370/487, 370/490, 370/493

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5412416</u>	May 1995	Nemirofsky	455/3.1
<u>5418782</u>	May 1995	Wasilewski	455/3.1
<u>5583562</u>	December 1996	Birch et al.	455/3.1
<u>5594490</u>	January 1997	Dawson et al.	455/3.2
<u>5633870</u>	May 1997	Gaytan et al.	370/412

ART-UNIT: 271

PRIMARY-EXAMINER: Kostak; Victor R.

## ABSTRACT:

A digital data delivery system which uses satellite broadcasting to deliver digital data along with audio and video signals. Digital data files are divided into packets and combined with audio and video packets in a time-division-multiplexed format. The time-division-multiplexed data is digitally modulated and then uplinked to a satellite transponder. The satellite transponder broadcasts the data to a multiplicity of user stations. The data which are broadcast by the satellite transponder are received by a satellite dish at each user station. Each satellite dish then relays the data to a receiver. The receiver identifies and separates the digital data file packets from the audio and video packets and outputs the digital data file packets to a data output port. A data bridge receives the packets from the data output port, buffers the packets, and converts the packets into a format that can be read by standard commercial I/O cards.

9 Claims, 5 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 11. Document ID: US 5819000 A

L5: Entry 11 of 22

File: USPT

Oct 6, 1998

US-PAT-NO: 5819000

DOCUMENT-IDENTIFIER: US 5819000 A

TITLE: Magnetic recording and playback apparatus

DATE-ISSUED: October 6, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Oshima; Mitsuaki	Kyoto			JP

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Matsushita Electric Industrial Co., Ltd.	Osaka			JP		03

APPL-NO: 08/ 037108

DATE FILED: March 25, 1993

## FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	7-067934	March 26, 1992
JP	4-256070	September 25, 1992

INT-CL: [06] H04 N 5/91, H04 N 5/38

US-CL-ISSUED: 386/46; 348/723

US-CL-CURRENT: 386/46; 348/723

FIELD-OF-SEARCH: 358/335, 358/342, 358/360, 358/330, 348/723, 348/724, 348/21, 348/24, 348/729, 348/17, 348/22, 348/608, 348/636, 348/725, 348/737, 386/46

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5038219</u>	August 1991	Yamashita et al.	358/310
<u>5164963</u>	November 1992	Lawrence et al.	348/723
<u>5267021</u>	November 1993	Ramchandran et al.	358/12
<u>5282019</u>	January 1994	Basile et al.	348/723
<u>5311547</u>	May 1994	Wei	375/18
<u>5481412</u>	January 1996	Bamair et al.	360/18

ART-UNIT: 272

PRIMARY-EXAMINER: Chevalier; Robert

ABSTRACT:

At the transmitter side, carrier waves are modulated according to an input signal for producing relevant signal points in a signal space diagram. The input signal is divided into, two, first and second, data streams. The signal points are divided into signal point groups to which data of the first data stream are assigned. Also, data of the second data stream are assigned to the signal points of each signal point group. A difference in the transmission error rate between first and second data streams is developed by shifting the signal points to other positions in the space diagram. At the receiver side, the first and/or second data streams can be reconstructed from a received signal. In TV broadcast service, a TV signal is divided by a transmitter into, low and high, frequency band components which are designated as a first and a second data stream respectively. Upon receiving the TV signal, a receiver can reproduce only the low frequency band component or both the low and high frequency band components, depending on its capability.

12 Claims, 142 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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NAME	Draw Desc	Image
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☐ 12. Document ID: US 5802241 A

L5: Entry 12 of 22

File: USPT

Sep 1, 1998

US-PAT-NO: 5802241

DOCUMENT-IDENTIFIER: US 5802241 A

TITLE: Communication system

DATE-ISSUED: September 1, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Oshima; Mitsuaki	Kyoto			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Matsushita Electric Industrial Co., Ltd.	Osaka			JP		03

APPL-NO: 08/ 706376

DATE FILED: August 30, 1996

PARENT-CASE:

This application is a continuation of application Ser. No. 08/217,895 filed Mar. 25, 1994 now abandoned, which in turn is a Continuation-in-Part of application Ser. No. 08/126,589, filed Sep. 27, 1993, which in turns is a Continuation-in-Part of application Ser. No. 08/037,108, filed Mar. 25, 1993.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	4-67934	March 26, 1992
JP	4-256070	September 25, 1992
JP	5-66461	March 25, 1993
JP	5-132984	May 10, 1993
JP	5-261612	September 24, 1993
JP	5-349972	December 27, 1993

INT-CL: [06] H04 N 5/91, H04 N 5/38

US-CL-ISSUED: 386/46; 348/723  
US-CL-CURRENT: 386/46; 348/723

FIELD-OF-SEARCH: 348/21, 348/24, 348/729, 348/17, 348/22, 348/608, 348/636, 348/723,  
348/725, 348/737, 386/46

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5087975</u>	February 1992	Citta et al.	
<u>5282019</u>	January 1994	Basile et al.	
<u>5291289</u>	March 1994	Hulyalkar et al.	348/273

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0485108	May 1992	EP	
0485105	May 1992	EP	
0506400	September 1992	EP	
0540231	May 1993	EP	

OTHER PUBLICATIONS

4th International Workshop on HDTV, Sep. 1991, Torino, IT; Elsevier 1992; pp. 61-69, Uz et al.: "Multiresolution Source and Channel Coding for Digital Broadcast of HDTV".

SMPTE Journal, vol. 101, No. 8, Aug. 1992, Scarsdale, NY US; pp. 538-549, Schreiber "Spread-Spectrum Television Broadcasting".

Signal Processing: Image Communication, vol. 4, Aug. 1992, Amsterdam, NL; pp. 283-292, Uz et al.: "Combined Multiresolution Source Coding and Modulation for Digital Broadcast of HDTV".

Biglieri et al, "Introduction to Trellis-Coded Modulation with Applications", 1991, MacMillan, New York, US.

IEEE International Conference on Communications, 23-26 May 1993, Geneva, CH; New York, US, 1993; pp. 1081-1085, Fazel & Ruf: "Combined Multilevel Coding and Multiresolution Modulation".

European Transactions on Telecommunications and Related Technologies, vol. 4, No. 3, May 1993, Italy; pp. 325-334, Seshadri & Sundberg, "Multi-level Block Coded Modulations with Unequal Error Protection for the Rayleigh Fading Channel".

Multidimensional Systems and Signal Processing, vol. 3, No. 2-3, May 1992, NL, pp. 161-187, Vetterli et and Uz: "Multiresolution Coding Techniques for Digital Television: A Review".

IEEE Transactions on Information Theory, vol. 18, No. 1, Jan. 1972, New York, US; pp. 2-4, Cover: "Broadcast Channels".

IEEE Global Telecommunications Conference 1991, 2-5 Dec. 1991, Phoenix, US; IEEE New York, US. 1991; pp. 40-46, Hoehner et al.: "Performance of an RCP-Coded OFDM-Based Digital Audio Broadcasting (DAB) System".

ART-UNIT: 272

PRIMARY-EXAMINER: Chevalier; Robert

ABSTRACT:

At the transmitter side, carrier waves are modulated according to an input signal for producing relevant signal points in a signal space diagram. The input signal is divided into, two, first and second, data streams. The signal points are divided into signal point groups to which data of the first data stream are assigned. Also,

data of the second data stream are assigned to the signal points of each signal point group. A difference in the transmission error rate between first and second data streams is developed by shifting the signal points to other positions in the space diagram expressed at least in the polar coordinate system. At the receiver side, the first and/or second data streams can be reconstructed from a received signal. In TV broadcast service, a TV signal is divided by a transmitter into, low and high, frequency band components which are designated as a first and a second data streams respectively. Upon receiving the TV signal, a receiver can reproduce only the low frequency band component or both the low and high frequency band components, depending on its capability. Furthermore, a communication system based on an OFDM system is utilized for data transmission of a plurality of subchannels, wherein the subchannels are differentiated by changing the length of a guard time slot or a carrier wave interval of a symbol transmission time slot, or changing the transmission electric power of the carrier.

5 Claims, 205 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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NUMC	Draw Desc	Image
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☐ 13. Document ID: US 5600672 A

L5: Entry 13 of 22

File: USPT

Feb 4, 1997

US-PAT-NO: 5600672

DOCUMENT-IDENTIFIER: US 5600672 A

TITLE: Communication system

DATE-ISSUED: February 4, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Oshima; Mitsuaki	Kyoto			JP
Sakashita; Seiji	Osaka			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Matsushita Electric Industrial Co., Ltd.	Osaka			JP		03

APPL-NO: 08/ 240521

DATE FILED: May 10, 1994

PARENT-CASE:

CROSS-REFERENCE TO RELATED APPLICATIONS This application is a continuation-in-part of application Ser. No. 07/857,627, filed Mar. 25, 1992, pending.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	3-62798	March 27, 1991
JP	3-95813	April 25, 1991
JP	3-155650	May 29, 1991
JP	3-182236	July 23, 1991
JP	4-60739	March 17, 1992
JP	5-132984	May 10, 1993
JP	5-261612	September 24, 1993
JP	5-349972	December 27, 1993
JP	6-79668	March 24, 1994



INT-CL: [06] H04 L 5/16, H04 B 1/38

US-CL-ISSUED: 375/219; 375/270, 375/301, 375/321

US-CL-CURRENT: 375/219; 375/270, 375/301, 375/321

FIELD-OF-SEARCH: 375/219, 375/259, 375/260, 375/261, 375/262, 375/265, 375/270, 375/240, 375/321, 375/326, 375/341, 375/354, 348/725, 348/726, 348/723, 348/724

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5164963</u>	November 1992	Lawrence et al.	375/265

OTHER PUBLICATIONS

Shanmugam, "Digital and Analog Communication Systems" 1979, p. 272.

ART-UNIT: 264

PRIMARY-EXAMINER: Chin; Stephen

ASSISTANT-EXAMINER: Phan; Hai H.

ABSTRACT:

At the transmitter side, carrier waves are modulated according to an input signal for producing relevant signal points in a signal space diagram. The input signal is divided into, two, first and second, data streams. The signal points are divided into signal point groups to which data of the first data stream are assigned. Also, data of the second data stream are assigned to the signal points of each signal point group. A difference in the transmission error rate between first and second data streams is developed by shifting the signal points to other positions in the space diagram expressed at least in the polar coordinate system. At the receiver side, the first and/or second data streams can be reconstructed from a received signal. In TV broadcast service, a TV signal is divided by a transmitter into low and high frequency band components which are designated as first and second data streams respectively. Upon receiving the TV signal, a receiver can reproduce only the low frequency band component or both the low and high frequency band components, depending on its capability. Furthermore, a communication system based on an OFDM system is utilized for data transmission of a plurality of subchannels, wherein the subchannels are differentiated by changing the length of a guard time slot or a carrier wave interval of a symbol transmission time slot, or changing the transmission electric power of the carrier.

12 Claims, 213 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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Knowl	Draw Desc	Image
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☐ 14. Document ID: US 5355374 A

L5: Entry 14 of 22

File: USPT

Oct 11, 1994

US-PAT-NO: 5355374

DOCUMENT-IDENTIFIER: US 5355374 A

TITLE: Communication network with divisible auxilliary channel allocation

DATE-ISSUED: October 11, 1994

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hester; Phillip	Indian Harbour Beach	FL		
Highsmith; William	Indialantic	FL		
McDaniel; Don	Indialantic	FL		
Lusk; Alan	Dallas	TX		

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Scientific-Atlanta, Inc.	Atlanta	GA			02

APPL-NO: 08/ 165830

DATE FILED: December 14, 1993

## PARENT-CASE:

This application is a division of application Ser. No. 880,209, filed May 8, 1992, now abandoned.

INT-CL: [05] H04J 3/22

US-CL-ISSUED: 370/84; 370/95.1, 455/54.2

US-CL-CURRENT: 370/461; 370/468, 455/509

FIELD-OF-SEARCH: 455/49.1, 455/53.1, 455/54.2, 455/68, 379/58, 379/63, 370/69.1, 370/84, 370/95.1, 370/95.3, 340/825.03, 340/825.07, 340/825.54

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4477809</u>	October 1984	Bose	455/54.2
<u>4553262</u>	November 1985	Coe	455/54.2
<u>4763325</u>	August 1988	Wolfe et al.	370/95.3
<u>4780715</u>	October 1988	Kasagai	455/54.2
<u>5005171</u>	April 1991	Modisette, Jr. et al.	370/84

ART-UNIT: 263

PRIMARY-EXAMINER: Safourek; Benedict V.

## ABSTRACT:

A communication network having a master and a plurality of remotes, these remotes supporting a plurality of co-services, in which access to inbound frequencies among the remotes is shared. When a need by a remote for an extraordinary amount of bandwidth is detected, a reserved spillover frequency from a set of frequencies is reserved for that remote. This bandwidth is reallocated when the need for extraordinary bandwidth for that remote has ended.

9 Claims, 7 Drawing figures

☐ 15. Document ID: US 5351240 A

L5: Entry 15 of 22

File: USPT

Sep 27, 1994

US-PAT-NO: 5351240

DOCUMENT-IDENTIFIER: US 5351240 A

TITLE: Communication link having dynamically allocatable auxiliary channel for data bursts

DATE-ISSUED: September 27, 1994

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Highsmith; William	Indialantic	FL		

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Scientific-Atlanta, Inc.	Atlanta	GA			02

APPL-NO: 08/ 165829

DATE FILED: December 14, 1993

## PARENT-CASE:

This application is a division of application Ser. No. 880,209, filed May 8, 1992, now abandoned.

INT-CL: [05] H04J 3/22

US-CL-ISSUED: 370/84; 370/95.1, 455/54.2

US-CL-CURRENT: 370/461; 370/468, 455/509

FIELD-OF-SEARCH: 455/49.1, 455/53.1, 455/54.2, 455/68, 379/58, 379/63, 370/69.1, 370/84, 370/95.1, 370/95.3, 370/85.7, 340/825.03, 340/825.07, 340/825.54

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4477809</u>	October 1984	Bose	455/54.2
<u>4553262</u>	November 1985	Coe	455/54.2
<u>4780715</u>	October 1988	Kasugai	455/54.2
<u>5005171</u>	April 1991	Modisette et al.	370/84

ART-UNIT: 263

PRIMARY-EXAMINER: Safourek; Benedict V.

## ABSTRACT:

A communication network having a master and a plurality of remotes, these remotes supporting a plurality of co-services, in which access to inbound frequencies among the remotes is shared. When a need by a remote for an extraordinary amount of bandwidth is detected, a reserved spillover frequency from a set of frequencies is reserved for that remote. This bandwidth is reallocated when the need for extraordinary bandwidth for that remote has ended.

19 Claims, 7 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 16. Document ID: US 5349580 A

L5: Entry 16 of 22

File: USPT

Sep 20, 1994

US-PAT-NO: 5349580

DOCUMENT-IDENTIFIER: US 5349580 A

TITLE: Method and apparatus for channel allocation integrity in a communication network

DATE-ISSUED: September 20, 1994

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hester; Phillip	Indian Harbour Beach	FL		
Highsmith; William	Indialantic	FL		

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Scientific-Atlanta, Inc.	Atlanta	GA			02

APPL-NO: 08/ 165889

DATE FILED: December 14, 1993

## PARENT-CASE:

This application is a division of application Ser. No. 880,209, filed May 8, 1992, now abandoned.

INT-CL: [05] H04J 3/22

US-CL-ISSUED: 370/84; 370/95.1, 455/54.2

US-CL-CURRENT: 370/461; 370/468, 455/509

FIELD-OF-SEARCH: 455/49.1, 455/53.1, 455/54.2, 455/68, 379/58, 379/63, 370/69.1, 370/84, 370/95.1, 370/95.3, 340/825.03, 340/825.07, 340/825.54

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4477809</u>	October 1984	Bose	455/54.2
<u>4553262</u>	November 1985	Coe	455/54.2
<u>4763325</u>	August 1988	Wolfe et al.	370/95.3
<u>4780715</u>	October 1988	Kasugai	455/54.2
<u>5005171</u>	April 1991	Modisett, Jr. et al.	370/84

ART-UNIT: 263

PRIMARY-EXAMINER: Safourek; Benedict V.

## ABSTRACT:

A communication network having a master and a plurality of remotes, these remotes supporting a plurality of co-services, in which access to inbound frequencies among the remotes is shared. When a need by a remote for an extraordinary amount of bandwidth is detected, a reserved spillover frequency from a set of frequencies is reserved for that remote. This bandwidth is reallocated when the need for extraordinary bandwidth for that remote has ended.

10 Claims, 7 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 17. Document ID: US 5265150 A

L5: Entry 17 of 22

File: USPT

Nov 23, 1993

US-PAT-NO: 5265150

DOCUMENT-IDENTIFIER: US 5265150 A

TITLE: Automatically configuring wireless PBX system

DATE-ISSUED: November 23, 1993

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Helmkamp; David J.	Jersey City	NJ		
Smith; James W.	Middletown	NJ		

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
AT&T Bell Laboratories	Murray Hill	NJ			02

APPL-NO: 07/ 647943

DATE FILED: January 30, 1991

INT-CL: [05] H04M 11/00, H04B 7/15, H04B 1/00

US-CL-ISSUED: 379/58; 379/59, 379/60, 455/11.1, 455/17, 455/56.1

US-CL-CURRENT: 455/555; 455/11.1, 455/17, 455/411, 455/418

FIELD-OF-SEARCH: 379/58, 379/56, 379/60, 379/59, 455/33.3, 455/33.4, 455/54.1, 455/31, 455/39, 455/18, 455/15, 455/33.2, 455/10, 455/56.1, 455/17, 455/16

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4112257</u>	September 1978	Frost	379/60
<u>4284848</u>	August 1981	Frost	455/11.1
<u>4347626</u>	August 1982	Wenzel	455/18
<u>4528654</u>	July 1985	Morais	379/58
<u>4578815</u>	March 1986	Persinotti	455/15
<u>4659878</u>	April 1987	Dinkins	455/33.2
<u>4672658</u>	June 1987	Kavehrad	379/63
<u>4803738</u>	February 1989	Ikeda	455/10
<u>4833702</u>	May 1989	Shitara et al.	379/60
<u>4881271</u>	November 1989	Yamauchi et al.	455/56.1
<u>4941200</u>	July 1990	Leslie et al.	455/17
<u>4972456</u>	November 1990	Kaczmarek et al.	379/59
<u>5095529</u>	March 1992	Comroe et al.	455/16
<u>5129096</u>	July 1992	Burns	455/18
<u>5133001</u>	July 1992	Bohm	379/58
<u>5170488</u>	December 1992	Furuya	455/56.1

## FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0107542	May 1987	JP	455/39

ART-UNIT: 268

PRIMARY-EXAMINER: Ng; Jin F.

ASSISTANT-EXAMINER: Cumming; William D.

## ABSTRACT:

A wireless PBX system provides ease of installation without site engineering or trial-and-error placement of components within the system. In its basic form, the wireless PBX system consists of only two types of components: a control unit including an radio frequency transceiver; and fixed location terminals, such as telephones and voice/data stations, which also include radio frequency transceivers. Portable handsets are optionally included in the system to allow for customer mobility. Installation of the PBX system is achieved simply by placing the system components in the desired locations at a premises, plugging them into line power, and performing some simple programming steps including a final step of initiating an automatic configuring process. Through this process, the system automatically configures itself for optimum operation in view of the radio environment and placement of components within the system at the customer premises. In the operation of this process, the control unit exchanges various radio messages with the terminals, decides which terminals should also serve as repeaters for linking those more distantly located terminals, and determines the appropriate frame structure for the system. A positive display indication at the control unit, following the end of the automatic configuring process, shows that all terminals have been linked and that the system is operating normally.

20 Claims, 12 Drawing figures

☐ 18. Document ID: US 5054071 A

L5: Entry 18 of 22

File: USPT

Oct 1, 1991

US-PAT-NO: 5054071

DOCUMENT-IDENTIFIER: US 5054071 A

TITLE: Volume control for optimum television stereo separation

DATE-ISSUED: October 1, 1991

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bacon; Kinney C.	Duluth	GA		

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Scientific-Atlanta, Inc.	Atlanta	GA			02

APPL-NO: 07/ 306010

DATE FILED: February 3, 1989

INT-CL: [05] H04H 5/00, H04N 5/44

US-CL-ISSUED: 381/12; 358/194.1, 455/4

US-CL-CURRENT: 381/12; 348/734, 725/151

FIELD-OF-SEARCH: 381/1, 381/10, 381/11, 381/12, 381/104, 381/109, 358/144, 358/197, 358/194.1, 455/4, 455/232

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>2980766</u>	April 1961	Nulton, Jr. et al.	381/1
<u>4239937</u>	December 1980	Kampmann	381/28
<u>4536798</u>	August 1985	Reid, Jr. et al.	358/194.1
<u>4591622</u>	February 1986	Davidov et al.	358/194.1
<u>4591915</u>	May 1986	Davidov et al.	358/194.1
<u>4603349</u>	July 1986	Robbins	358/86
<u>4646150</u>	February 1987	Robbins et al.	358/144
<u>4652924</u>	March 1987	Davidov	358/194.1
<u>4691358</u>	September 1987	Bradford	381/12
<u>4748501</u>	May 1988	Long	358/86
<u>4748669</u>	May 1988	Klayman	381/25
<u>4751574</u>	June 1988	Mogi et al.	358/194.1
<u>4954899</u>	September 1990	Tanabe et al.	358/194.1

## FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
55-4167 (A)	January 1980	JP	

## OTHER PUBLICATIONS

"Cable and BTSC Stereo" by James O. Farmer, IEEE Transactions on Consumer Electronics, vol. CE-33, No. 1, Feb. 1987.  
"Stereo Sound for TV" by Alex Best, International TV Symposium, Symposium Record, Jun. 1989.  
Patent Abstracts of Japan, vol. 4, No. 32 (E-2) (514), Mar. 19, 1989.  
Frank McClatchle, "How BTSC Brings Stereo to the TV Set", published Mar. 1988, Communications Technology, pp. 49, 50, 52 and 54.  
Luis A. Rovira, "BTSC Stereo Separation on the Cable" presented at an SMPTE Meeting.

Mitsubishi Linear IC M5144P data sheets having an unknown publication date.  
1989 NCTA Technical Papers, pp. 15-20, The Importance of Setting and Maintaining Correct Signal and Modulation Levels in a CATV System Carrying BTSC Stereo Signals, by Chris Bowick.

ART-UNIT: 261

PRIMARY-EXAMINER: Isen; Forester W.

ABSTRACT:

Volume control for use in a cable television set top converter or the like is calibrated for optimum television stereo channel separation. The volume control controls the volume to predetermined levels. One of the predetermined levels is a particular level calibrated for optimum stereo separation. An indicator on the converter indicates the optimum stereo separation volume level. When an internal VCR timer turns on the set top converter, the set top converter is forced to the optimum stereo separation volume level. The calibration is performed during manufacture and ensures that the indicated volume level for optimum stereo separation is indeed the optimum volume level.

54 Claims, 13 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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NUMC	Draw Desc	Image
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☐ 19. Document ID: US 4982288 A

L5: Entry 19 of 22

File: USPT

Jan 1, 1991

US-PAT-NO: 4982288

DOCUMENT-IDENTIFIER: US 4982288 A

TITLE: High definition television receiver enabling picture-in picture display

DATE-ISSUED: January 1, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Isobe; Mitsuo	Osaka			JP
Hamada; Masanori	Kadoma			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
Matsushita Electric Industrial Co., Ltd.	Osaka			JP		03

APPL-NO: 07/ 310925

DATE FILED: February 16, 1989

INT-CL: [05] H04N 5/273



US-CL-ISSUED: 358/183; 358/22  
US-CL-CURRENT: 348/565; 348/452, 348/568

FIELD-OF-SEARCH: 358/183, 358/22, 358/138, 358/140

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4853765</u>	August 1989	Katsumata et al.	358/22 X

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
492419	January 1974	JP	

OTHER PUBLICATIONS

"HD-TV Broadcasting System Using Single Channel Satellite (MUSE)".

ART-UNIT: 262

PRIMARY-EXAMINER: Groody; James J.

ASSISTANT-EXAMINER: Powell; Mark R.

ABSTRACT:

A television signal receiving apparatus of the type in which when performing a picture in picture operation by receiving a plurality of picture signals compressed in band width by multiple sub-Nyquist sampling, a sub-channel signal is first subjected to a spatial interpolating process and combined with a main-channel signal. The still picture portion and moving picture portion of a first input signal are restored to a field offset sub-sampled first picture signal, and a second input signal is restored to a field offset sub-sampled picture signal, subjected to a size-reducing process by time base compression in the vertical and horizontal directions of the picture and delivered as a second picture signal of the form synchronized in phase with a given position of the first picture signal. The first and second picture signals are time-division multiplexed to deliver a third picture signal onto a picture screen.

1 Claims, 3 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KNOW	Draw Desc	Image
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☐ 20. Document ID: WO 9940693 A1

L5: Entry 20 of 22

File: EPAB

Aug 12, 1999

PUB-NO: WO009940693A1

DOCUMENT-IDENTIFIER: WO 9940693 A1

TITLE: METHOD AND APPARATUS FOR COMBINING TRANSPONDERS ON MULTIPLE SATELLITES INTO VIRTUAL CHANNELS

PUBN-DATE: August 12, 1999

ASSIGNEE-INFORMATION:

NAME  
FRIEDMAN ROBERT F

COUNTRY  
US

APPL-NO: US09902333  
APPL-DATE: February 3, 1999

PRIORITY-DATA: US07361998P (February 4, 1998), US11369398P (December 24, 1998)

INT-CL (IPC): H04 B 7/185  
EUR-CL (EPC): H04B007/185

ABSTRACT:

CHG DATE=19990902 STATUS=O>A satellite communications system provides an information channel between remotely located transmitters and receivers. A virtual satellite system provides the same service, but divides the signal either in power or in data content into subchannels such that any particular signal is conducted to the intended receiver via a plurality of traditional satellite channels. The receiving terminal (16) accepts the plurality of signals (26A, 26B, 26C, 26D) simultaneously from a possible plurality of satellites (14A, 14B, 14C, 14D), combining the subchannels comprising the virtual channel into the original signal content as if conducted via a single channel. The receiving antenna system (16) receives satellite subchannel signals (14A, 14B, 14C, 14D) from a plurality of directions using multiple antennas or a single antenna (30) with multi-direction capability. Prior to signal combining, the receiver (16) necessarily time-synchronizes the plurality of subchannels by introducing time delay in some channels before combining the subsignals into the original composite.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMIC	Draw Desc	Image
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☐ 21. Document ID: US 20020057745 A1

L5: Entry 21 of 22

File: DWPI

May 16, 2002

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DERWENT-WEEK: 200305  
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TITLE: Multi-channel satellite uplink transmission system for satellite communication system, has modulator to modulate subchannel signals received through satellites and combiner to combine modulated signals

INVENTOR: FRIEDMAN, R F

PATENT-ASSIGNEE: FRIEDMAN R F (FRIEI)

PRIORITY-DATA: 1999US-142179P (July 1, 1999), 1999US-0243910 (February 3, 1999), 1999US-0438865 (November 12, 1999), 2001US-0039632 (October 26, 2001)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
US 20020057745 A1	May 16, 2002		016	H04L027/12

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
US20020057745A1	February 3, 1999	1999US-0243910	CIP of
US20020057745A1	July 1, 1999	1999US-142179P	Provisional
US20020057745A1	November 12, 1999	1999US-0438865	Cont of
US20020057745A1	October 26, 2001	2001US-0039632	

INT-CL (IPC): H04 L 27/04; H04 L 27/12; H04 L 27/20

RELATED-ACC-NO: 2003-056729

ABSTRACTED-PUB-NO: US20020057745A

BASIC-ABSTRACT:

NOVELTY - A transmitting subsystem (12) has a subchannel divider (24) which divides a digital signal into several subchannel signals of lower bit rate. Several antennas (28a-28d) transmit the divided signals to a receiving subsystem (16) through satellites (14a-14d). Several demodulators (34) in the receiving subsystem demodulate the received subchannel signals. A combiner (38) combines the demodulated signals to generate the original digital signal (40).

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for receiving system.

USE - For satellite communication system.

ADVANTAGE - Bandwidth requirements need not be increased to accommodate timing signal and the full bandwidth of the information channel is available.

DESCRIPTION OF DRAWING(S) - The figure shows a schematic block diagram of the multi-channel satellite uplink transmission system.

Transmitting subsystem 12

Satellite 14a-14d

Receiving subsystem 16

Subchannel divider 24

Antennas 28a-28d

ABSTRACTED-PUB-NO: US20020057745A

EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.1/6

DERWENT-CLASS: W01 W02

EPI-CODES: W01-A09E1; W02-C03A1A; W02-C03B1A; W02-C03B1C;

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Clip Img	Image
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☐ 22. Document ID: WO 9940693 A1 AU 9927605 A EP 1046246 A1 US 6154501 A

L5: Entry 22 of 22

File: DWPI

Aug 12, 1999

DERWENT-ACC-NO: 1999-540064

DERWENT-WEEK: 199945

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TITLE: Satellite communications system

INVENTOR: FRIEDMAN, R F

PATENT-ASSIGNEE: FRIEDMAN R F (FRIEI)

PRIORITY-DATA: 1998US-113693P (December 24, 1998), 1998US-073619P (February 4, 1998), 1999US-0243910 (February 3, 1999)

## PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
WO 9940693 A1	August 12, 1999	E	036	H04B007/185
AU 9927605 A	August 23, 1999		000	
EP 1046246 A1	October 25, 2000	E	000	H04B007/185
US 6154501 A	November 28, 2000		000	H04B003/36

DESIGNATED-STATES: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GD  
GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX  
NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU ZW AT BE CH CY DE DK  
EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SZ UG ZW AT BE CH CY DE  
DK ES FI FR GB GR IE IT LI LU MC NL PT SE

## APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
WO 9940693A1	February 3, 1999	1999WO-US02333	
AU 9927605A	February 3, 1999	1999AU-0027605	
AU 9927605A		WO 9940693	Based on
EP 1046246A1	February 3, 1999	1999EP-0908092	
EP 1046246A1	February 3, 1999	1999WO-US02333	
EP 1046246A1		WO 9940693	Based on
US 6154501A	February 4, 1998	1998US-073619P	Provisional
US 6154501A	December 24, 1998	1998US-113693P	Provisional
US 6154501A	February 3, 1999	1999US-0243910	

INT-CL (IPC): H04 B 3/36; H04 B 7/17; H04 B 7/185; H04 L 23/02; H04 L 27/28

ABSTRACTED-PUB-NO: US 6154501A

## BASIC-ABSTRACT:

NOVELTY - A delay is coupled to each demodulator output to delay the first-arriving subchannel signals so that outputs of the delays are synchronized in time.

DETAILED DESCRIPTION - The satellite communications system which provides an enhanced digital communication channel includes:

(a) a multi-channel uplink system that divides the original signal into several subchannels and adds a common timing signal to each subchannel, the multi-channel uplink system comprises:

(b) a subchannel divider to transform the original digital signal into several digital subchannels such that each digital subchannel signal contains at least some information unique to that subchannel and also such that the bit rate of each digital subchannel signal is lower than the bit rate of the original digital signal;

(c) a timing generator to create a periodic signal,

(d) signal combiner coupled to the timing generator output and the subchannel divider output associated with each subchannel to add the common timing signal to each subchannel information signal and within the bandwidth of each subchannel information signal such that no additional bandwidth allocation is required to transmit the timing information signal;

(e) upconverter coupled to the signal combiner output associated with each

subchannel to translate the frequency of the timing-added subchannel signal to the frequency of the selected satellite transponder;

(f) amplifier coupled to the upconverter output associated with each subchannel to increase the power of the translated, timing-added subchannel signal; and

(g) antenna coupled to the amplifier output associated with each subchannel directing a radio frequency wave toward the receiving antenna of the satellite containing the transponder selected for the associated subchannel; and

(h) a receiving terminal system to collect signals from several selected satellite transponders and create a delayed reconstruction of the original signal, where the receiving terminal system comprises:

(i) a multiple beam antenna to simultaneously receive signals from the transponders and present each of the signals on a separate output port;

(j) a tuner coupled to each multiple beam antenna output port to translate the frequency of each received signal to a fixed intermediate frequency;

(k) a demodulator coupled to each tuner output to demodulate tuner output and create a bit stream corresponding to the information content of the associated subchannel;

(l) delay coupled to each demodulator output to delay first-arriving subchannel signals such that outputs of the delays are synchronized in time;

(m) a digital combiner coupled to the output of the delays to combine the information in each subchannel into a delayed reconstruction of the original digital signal;

(n) a timing signal correlator coupled to each tuner output to measure the relative delay between arriving subchannel signals;

(o) a nonvolatile memory to store information about the frequency and propagation delay properties of the virtual channels to be selected; and

(p) a controller coupled to the multiple beam antenna, the tuners, the delays, the timing signal correlator, and the nonvolatile memory to receive signals from the timing signal correlator and the nonvolatile memory and issue control signals to the multiple beam antenna to set beam direction and polarization, control signals to the tuners to set subchannel receive frequencies, and control signals to the delays to synchronize delay outputs.

USE - For satellite communications systems.

ADVANTAGE - Does not increase the bandwidth requirements of the virtual channel to accommodate the timing signal. The full bandwidth of the information channel is available to the timing signal resulting in higher resolution relative delay estimate.

DESCRIPTION OF DRAWING(S) - The drawing shows a schematic and block diagram of the system.

ABSTRACTED-PUB-NO: WO 9940693A  
EQUIVALENT-ABSTRACTS:

NOVELTY - A delay is coupled to each demodulator output to delay the first-arriving subchannel signals so that outputs of the delays are synchronized in time.

DETAILED DESCRIPTION - The satellite communications system which provides an enhanced digital communication channel includes:

(a) a multi-channel uplink system that divides the original signal into several subchannels and adds a common timing signal to each subchannel, the multi-channel uplink system comprises:

- (b) a subchannel divider to transform the original digital signal into several digital subchannels such that each digital subchannel signal contains at least some information unique to that subchannel and also such that the bit rate of each digital subchannel signal is lower than the bit rate of the original digital signal;
- (c) a timing generator to create a periodic signal,
- (d) signal combiner coupled to the timing generator output and the subchannel divider output associated with each subchannel to add the common timing signal to each subchannel information signal and within the bandwidth of each subchannel information signal such that no additional bandwidth allocation is required to transmit the timing information signal;
- (e) upconverter coupled to the signal combiner output associated with each subchannel to translate the frequency of the timing-added subchannel signal to the frequency of the selected satellite transponder;
- (f) amplifier coupled to the upconverter output associated with each subchannel to increase the power of the translated, timing-added subchannel signal; and
- (g) antenna coupled to the amplifier output associated with each subchannel directing a radio frequency wave toward the receiving antenna of the satellite containing the transponder selected for the associated subchannel; and
- (h) a receiving terminal system to collect signals from several selected satellite transponders and create a delayed reconstruction of the original signal, where the receiving terminal system comprises:
  - (i) a multiple beam antenna to simultaneously receive signals from the transponders and present each of the signals on a separate output port;
  - (j) a tuner coupled to each multiple beam antenna output port to translate the frequency of each received signal to a fixed intermediate frequency;
  - (k) a demodulator coupled to each tuner output to demodulate tuner output and create a bit stream corresponding to the information content of the associated subchannel;
  - (l) delay coupled to each demodulator output to delay first-arriving subchannel signals such that outputs of the delays are synchronized in time;
  - (m) a digital combiner coupled to the output of the delays to combine the information in each subchannel into a delayed reconstruction of the original digital signal;
  - (n) a timing signal correlator coupled to each tuner output to measure the relative delay between arriving subchannel signals;
  - (o) a nonvolatile memory to store information about the frequency and propagation delay properties of the virtual channels to be selected; and
  - (p) a controller coupled to the multiple beam antenna, the tuners, the delays, the timing signal correlator, and the nonvolatile memory to receive signals from the timing signal correlator and the nonvolatile memory and issue control signals to the multiple beam antenna to set beam direction and polarization, control signals to the tuners to set subchannel receive frequencies, and control signals to the delays to synchronize delay outputs.

USE - For satellite communications systems.

ADVANTAGE - Does not increase the bandwidth requirements of the virtual channel to accommodate the timing signal. The full bandwidth of the information channel is available to the timing signal resulting in higher resolution relative delay estimate.